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BOVINE TUBERCULOUS MASTITIS

A Review of the Position in the North-East of Scotland (Banffshire)

WILLIAM M. McKAY, PH.D., M.R.C.V.S.,
FORGUE, ABERDEENSHIRE

From the common standpoint of the veterinarian and the physician, the most important clinical manifestation of tuberculosis in bovines is mastitis.

Udder tuberculosis appears to be evident in about 0·4 per cent. of the dairy cow population of Banffshire. This figure is consistent for the three years of the investigation and agrees with that reported by Davidson (1938) for Staffordshire and Rabagliati (1937) for the West Riding of Yorkshire. Torrance (1937) puts the figure at 0·69 per cent. of the cow population. Allan (1937) in Durham County shows a figure of 0·47 per cent., Medlock (1937) shows that in 1936 in Essex 0·67 per cent. of the dairy cow population was affected in the udder, while Jordan (1937) found 0·2 per cent. affected in West Sussex. The average incidence would seem, therefore, to be in the region of 0·5 per cent. of the dairy cow population based on the results of careful quarterly clinical examination, with microscopical examinations of milk where necessary, and supported in many cases by check herd biological tests of milk.

The incidence in breeding herds is much more difficult to determine since no regular inspections are carried out. From the number of cases I have met with during the past three years, the incidence appears to be very much less than in dairies, *viz.*, 28 cases in an estimated population of 10,000 cows or an annual incidence of 0·09 per cent. As the opportunities for retaining and utilising these animals on farms are much greater than on inspected dairy premises, this figure cannot be considered accurate in any sense, *i.e.*, many animals are retained on the farm until they die or are moribund, never coming to official attention.

Tuberculous mastitis is in 70 per cent. of clinical cases found to be a terminal clinical manifestation, as evidenced by *post-mortem* examination.

Johnstone (1937) shows that about 72 per cent. of udder cases dealt with in Bedfordshire were found to be generalised cases on *post-mortem* examination.

There is a well recognised pre-clinical condition in the cow where there may be abundant tubercle bacilli excreted in the milk without any macroscopic lesions in the udder. These cases can only be identified by laboratory as distinct from clinical examination.

Griffith (1911) performed some interesting experiments on behalf of the Royal Commission on Tuberculosis, when he showed that tubercle bacilli were excreted in the milk of cows and goats after subcutaneous or intravenous inoculation of cultures. In one case a large dose (100 mg.) was injected subcutaneously into a healthy cow, and a series of guinea-pigs inoculated with milk from this cow developed tuberculosis from after the first week, until her death in 30 days, from generalised tuberculosis. The udder of this cow was found to be normal on naked-eye and microscopical examination. In another case a cow, given the same dose of culture, was found to be excreting tubercle bacilli in her milk 24 hours afterwards, and continued to infect guinea-pigs up to 155 days later, and *post-mortem* examination showed the udder to be normal. Similar experiments on milch goats confirmed the results obtained in cows.

Griffith also showed that when large doses of tubercle culture were inoculated subcutaneously into 12 heifers, 6 to 18 months old, tubercle bacilli were recovered from the undeveloped udders of eight of the animals when killed in 62 to 127 days. In four of the heifers the organisms were found in such numbers as to suggest multiplication in the milk sinuses.

Titze, quoted by Calmette (1923) showed that after the intravenous injection of tubercle bacilli into a lactating cow the bacilli began to appear in the milk after about three weeks, and that they might persist for as long as 144 days without clinical manifestation in the udder. Again, Ishiwara, Moussu, Rabinowitch, Shroeder and Cotton, Escherich, Roger and Garnier, Guillemet, Rappin and others have shown that both in the human and animals, with apparently normal mammary glands but with positive tuberculin reactions, tubercle bacilli can be recovered from their milk. Of 20 tuberculous women (Kurashigez, Mayeyama and Yamada, 1912), tubercle bacilli were found in the milk of 17, or 85 per cent. Of these, nine were in an early or even pre-tuberculous stage. At the same time the authors stated that the number of bacilli found in the milk was small (two to seven organisms per c.c.).

Although cases have been recorded in heifers by others, tuberculosis of the udder has not been met with in animals under the age of three years, the average age of 92 cases examined being approximately seven years. It occurs clinically as a progressive induration of the mammary tissue, commencing anywhere in the udder but usually above the lactiferous sinus, and gradually extending until the entire udder tissue of the affected quarter is involved. Although tuberculous mastitis is usually slowly progressive, cases are known where the disease has developed from normality to an advanced stage within a few weeks. It is usual to find only one quarter of the udder affected, generally a hindquarter, but

sometimes two or more quarters are affected. The associated suprammary lymphatic gland is always enlarged.

I have encountered primary tuberculosis of the udder only once in Banffshire, so that while infection by the teat canal can and does occur, it apparently does so very rarely. Tuberculous mastitis, therefore, is in practically every case an extension of the disease from the thoracic or abdominal cavities, and has seldom been found in the absence of pulmonary tuberculosis, the pulmonary infection being apparently the primary site of disease in about 28·3 per cent. of the cases.

Many of the cases of udder tuberculosis examined by me had a history of a previous acute mastitis, and it seems likely that where such previous inflammatory disease had weakened the mammary tissue and the cow had active tuberculous lesions, the environment was then suitable for an extension of the tuberculosis into the udder, provided it remained capable of milk secretion.

Once disease is established, the affected part of the quarter feels dense and without elasticity, and the quarter becomes increasingly pendulous. As the disease progresses, more and more tissue becomes involved until ultimately the whole quarter is heavy and as hard as an inflated motor tyre and not unlike a segment of one in shape. The corresponding lymphatic gland becomes readily palpable, and may become markedly indurated. Atypical cases are sometimes met with, in which the affected quarter is atrophied and feels " shotty."

The milk at first is normal in appearance, but as the disease advances the quantity diminishes, the fat content falls, and the milk becomes more and more serous in character until eventually it is almost entirely so, with little or no fat and only cellular contents.

The evidence I have obtained from *post-mortem* examinations seems to indicate that in nearly every case the mastitis was the result of haematogenous infection. When macroscopic lesions even of a very extensive nature, existed in a quarter of the udder the corresponding lymphatic gland was usually only congested and enlarged, and without macroscopic lesions. When macroscopic lesions were found in a supramammary lymph gland, it was common to find the udder macroscopically free from disease. In a small number of cases, lesions in both the gland and the udder were found, but the infection had not been contemporary in both. In such cases the gland showed old lesions while the udder infection was apparently of recent occurrence.

The usual *post-mortem* finding is simply nodular or diffuse mastitis with small caseating or calcifying areas and marked enlargement of the corresponding supramammary lymph gland. True cavity formation was encountered in 3 per cent. of cases.

As has already been noted, in practically every case pulmonary infection was present, and it seems logical to assume that the mastitis was due to infection of the blood stream from a lung focus discharging directly into the pulmonary circulation and carried by the blood to the mammary artery, and so into the mammary tissue where the organisms were arrested by the secretory cells, and local lesions developed. The toxins produced were then carried by the lymph stream, and as a consequence the regional lymphatic gland became enlarged. Torrance (1937) holds the opinion that " Where on *post-mortem* examination tuberculosis of the udder exists with enlargement of the supramammary lymphatic gland, or where macroscopic lesions of tubercle are found in the gland with older lesions in the udder, infection of that organ has been haematogenous; the vast majority of cases of tuberculosis (of the udder) fall within this category."

The following Banffshire cases are given as being representative of the *post-mortem* findings in cases of tuberculous mastitis. The designation in parenthesis denotes the apparent primary lesions :—

Five-year-old cow—generalised tuberculosis (pulmonary) with tuberculous mastitis of right hindquarter of udder, right supramammary lymph gland enlarged.

Seven-year-old cow—generalised (miliary) tuberculosis (abdominal), tuberculous mastitis of left hindquarter of udder, left supramammary lymph gland enlarged.

Eight - year - old cow — generalised tuberculosis (pulmonary) with tuberculosis of right forequarter of udder, right supramammary gland enlarged.

Five-year-old cow—generalised tuberculosis (pulmonary), tuberculous mastitis of left hindquarter, left supramammary lymph gland enlarged.

?-year-old cow—generalised tuberculosis (abdominal), tuberculous mastitis of right hindquarter, corresponding lymph gland enlarged.

Ten-year-old cow—generalised tuberculosis (abdominal), tuberculous mastitis both hindquarters of udder, both supramammary lymph glands enlarged.

Six-year-old cow—generalised tuberculosis (abdominal), tuberculous mastitis right hindquarter of udder with lesions in the right supramammary gland of old standing.

Seven-year-old cow—generalised tuberculosis (abdominal), tuberculous mastitis of left hindquarter and enlarged left supramammary lymph gland.

Aged cow—generalised (miliary) tuberculosis with tuberculous mastitis of all four quarters of udder, both supramammary lymph glands enlarged.

Ten-year-old cow—generalised tuberculosis (abdominal), cascous lesions in left supramammary lymph gland, udder normal.

Seven-year-old cow—generalised (miliary) tuberculous mastitis of both hindquarters of udder, both lymph glands enlarged.

Eight - year - old cow—generalised tuberculosis (pulmonary) tuberculous mastitis of left hindquarter of udder with caseous areas in right supramammary lymph gland.

Seven-year-old cow—generalised tuberculosis (pulmonary), with caseous nodules in right supramammary gland, udder normal.

Four-year-old cow—localised pulmonary tuberculosis with tuberculous mastitis of left forequarter of udder, left supramammary lymph gland enlarged.

Twelve-year-old cow—generalised tuberculosis (abdominal), tuberculous mastitis of right hindquarter of udder, corresponding supramammary lymph gland enlarged.

In the above 14 cases, 13 were generalised and of these, three were advanced miliary tuberculosis. Eight showed tuberculosis of the udder without naked-eye lesions in the lymphatic glands, four showed lesions in both gland and udder, while two showed lesions in the lymph gland only. It will be clearly seen that in the majority of cases a lymphatic spread cannot be considered and that where the lymph system was involved the udder either showed lesions of longer standing or no lesions whatever.

The value of biological examination of blood from cases showing disease of the udder was considered as a means of supporting the thesis that such cases were of haematogenous origin, but was discarded. It was considered that such possible bacillaemia would be intermittent, and the likelihood of obtaining experimental proof therefore too uncertain to give critical results.

During the period of my investigation, fully 10 per cent. of the dairy herds had tubercle infection

of the milk during the course of each year. Smith (1932) showed by biological examination of milk from 279 different sources in the North-East of Scotland, that 10·3 per cent. of the samples contained *Mycobacterium tuberculosis*. The daily amount from the herd or herds involved varied from 1 to over 100 gallons. His results are shown in the following table (Table I):—

TABLE I

Total amount of Daily Supply in Gallons	Total number of different Samples.	Incidence of *M. tuberculosis* No. +	No. —	Percentage +
1– 10	41	1	40	2·4
11– 20	57	6	51	10·5
21– 30	56	5	51	8·9
31– 40	46	5	41	10·8
41– 50	34	4	30	11·7
51– 60	17	2	15	11·7
61– 70	10	2	8	20·0
71– 80	4	0	4	0·0
81– 90	9	1	8	11·1
91–100	3	2	1	66·6
101–110	2	1	1	50·0
Totals ...	279	29	250	10·3

Generally speaking, therefore, the greater the bulk the higher the incidence of tubercle infection.

While this investigation was primarily into tuberculosis in bovines, it would not be complete without some reference to tuberculosis of bovine origin in humans. In a number of cases the detection of a tuberculous udder has resulted from a report of a possible bovine infection in children. More often it has happened that a clinical examination plus a bulk milk sample biologically examined as the result of such reports, have proved negative, but a history of a cow with a diseased udder has been obtained, the cow in question having been removed some time previously.

In a rural area such as Banffshire, with its population of agriculturists who are heavy milk consumers, the danger of tuberculous milk is not properly understood. The origin of tuberculosis, both human and bovine, remains largely almost a matter of superstition. It is still believed by the vast majority of the population that tuberculosis is non-infectious, and originates with a chill or a congenital "weakness."

The incidence of human tuberculosis of bovine origin in the North-East of Scotland has been investigated. In connection with pulmonary tuberculosis of bovine origin, Griffith (1937) has shown that the incidence of bovine infection is much greater than was at one time thought to be the case. As Griffith points out, until 1922, only four cases of pulmonary tuberculosis of bovine origin had been discovered. Between then and 1937, 159 further cases were recorded. The North-East of Scotland (including Banffshire) yielded 40 in 580 cases examined. The percentage bovine infection in rural areas was 8·5 per cent. and in city areas 5 per cent.

More recent work by Griffith and Smith (1938) showed that of a total of 69 Banffshire cases of pulmonary tuberculosis where sputum was available, no less than 8, or 11·6 per cent., were proved to be pure bovine infections on culture.

A summary of human and bovine infections in human pulmonary tuberculosis is given in Table II.

TABLE 2A

Regional Distribution of Pulmonary Tuberculosis Due to the Different Types of Tubercle Bacilli. (*Griffith and Smith* (1940))

Region	No. of cases	Types of Tubercle Bacilli: Eugonic Human	Dysgonic Human	Bovine
Aberdeenshire ...	222	189	13	20 (9·0%)
Banffshire ...	91	79	1	11
Morayshire ...	66	58	2	6
Kincardineshire ...	40	39	—	1
Caithness ...	15	12	1	2
Sutherland ...	2	2	—	—
Iverness-shire ...	5	5	—	—
Nairnshire ...	5	5	—	—
Orkneys	31	19	4	8
Shetland	63	60	2	1
Total country districts ...	540	468	23	49 (9·1%)
City of Aberdeen	432	399	14	19 (4·4%)
Total ...	972	867	37	68 (7·0%)

TABLE II (Smith)

Proportional Frequency of Human and Bovine Types of Tubercle Bacilli in Sputum.

Country	Region	Authors	Number Examined	Human	Bovine	Per cent. Bovine
Scotland ...	North East Rural	... Griffith	342	311	31	9·1
	City	... Smith	294			
	Middle and South	... Munro	947	902	45	4·6
		Griffith	495	474	21	
		Wang	29	28	1	
	North	... Cumming	888	874	14	1·6
	Middle	... Lynn and Cuthill ...	803	791	12	1·5
England ...	Middle	... Griffith and Menton ...	230	228	2	0·9
	South	... Griffith	690	684	4	0·6
	South	... Cumming	195	194	1	0·52
Wales ...		Cumming	203	201	2	1·0
	Various in England	... Cumming	245	224	21	
				Total Bovine ...	154	

A summary of the incidence of bovine type bacillus in human non-pulmonary tuberculosis is given in Table III.

Table III (Smith)

Percentage Incidence of Bovine Tuberculosis in Cases of Human Non-Pulmonary Tuberculosis

Type of Tuberculosis	England (Griffith) Per cent. Bovine	Scotland Per cent. Bovine	Germany (Lange) Per cent. Bovine	Denmark (Jensen) Per cent. Bovine
Cervical Adenitis	50	51·6	22·3	49·0
Bone and Joint	19·5	29·8	4·6	18·5
Genito-urinary	17·4	31·0	0·0	—
Lupus ...	48·7	69·2	24·3	—
Meningitis ...	24·6	29·2	0·0	24·7
Autopsies ...	22·5	32·4	9·4	—
Miscellaneous ...	8·7	71·4	—	—
Abdominal ...	—	—	32·7	—

A milk supply free of tuberculous infection is, therefore, of the very greatest importance.

Bovine tuberculosis cannot be considered as an animal health question alone and pasteurisation as a means to an end does nothing more than attempt to produce artificially a "safe" milk, and that only if the assumption is made that the pasteurisation process is carried out in a thorough manner, but it would not affect the permanent menace of tuberculosis at the source, and would still mean the consumption of "safe" milk containing the inert products and organisms of virulent disease.

A healthy tubercle-free cattle population would, in addition to supplying naturally safe milk, mean the elimination of a loss to agriculture of millions of pounds annually. This would make more animals available for consumption at a cheaper price, a thing greatly to be desired in the present age of malnutrition. Pasteurisation would not produce this result, and Smith (1932) has shown that inefficient pasteurisation may do no more than mix infected milk with the uninfected. His results are set forth in the following table (Table IV) :—

Table IV

Plant No.	Type	Pasteurisation at ° F.	No. of Samples	No. + for *M. Tuberculosis*	Percentage
1	Holder	145	78	0	0
2	,,	145	78	3	3·8
3	,,	145	31	1	3·2
4	Flash	145	85	9	10·0
5	,,	145	24	3	12·5
6	,,	140	34	1	3·2
7	,,	145	29	2	6·6
8	,,	140	20	4	20·0
		Total	379	23	6·0

In his conclusion Smith points out that 2·1 per cent. of 187 samples from "holding" pasteurisation showed tubercle bacilli, and that 9·8 per cent. of 192 samples from "flash" pasteurisation contained tubercle bacilli.

There is, therefore, direct experimental evidence that commercial pasteurisation may not fully achieve its object.

The other method of attack is clinical examination at the source, and the early recognition of cases of tuberculosis in an infective condition. The clinical examination must be frequent and thorough, and combine laboratory examination of milk, sputum and other material.

In the early stages it is difficult to detect the organisms on microscopical examination of milk deposit stained by the Ziehl-Neelsen method, and animal inoculation is necessary, but as the disease process advances and giant cell formation and endothelioid cell-groups become demonstrable in the smear, microscopic diagnosis becomes much easier. This has long been recognised. Torrance (1934) was, however, the first to introduce a method specially adapted to show up these cell-groups, and found that 92·5 per cent. of the udder cases confirmed by biological test were detected by this method, now widely known as the cell-group method. Maitland (1937), using a slight modification of this technique, reported that when 950 individual samples from affected quarters were examined by this method the microscopical results agreed with the biological findings except in one case.

Torrance (1934) states that 92·5 per cent. of his udder cases were so detected. The method, therefore, appears to have very definite value in the detection of cases of tuberculosis of the udder.

Cultural methods have been advocated by some workers as a means of obtaining reliable results in a short space of time to obviate the inconvenience of the time factor in animal inoculation. Such a method has not been used in this investigation. A comparison of the diagnostic value of culture and biological tests was made by Trautwein (1936). Using 1,109 samples, 299, or 27 per cent., were positive to the cultural test, and 316, or 28 per cent., were positive to the biological test. Witte (1937) showed that by using a suitable medium, good growth of easily recognisable tubercle bacilli was obtained in within 10 to 20 days on first isolation. He stressed that the medium used should be free of glycerine and that culture vessels should be sealed to obtain gas tension for rapid growth, and that the best results are obtained if tubercle bacilli are grown in symbiosis with *Bac. simplex*. Ruddock West (1937), using 1,742 samples which were negative on microscopic examination, found 76 positive by cultural methods, and had identical biological results. All were confirmed on *post-mortem* examination.

Serological tests for the recognition of tuberculous milk have been described. Vernes and his co-workers used a flocculation method, but Mattick and Christian (1934), using his technique, could not prove the method to have any value. The complement-fixation test, using whey or whole milk, has found favour with many workers, but it is not reliable since the results are merely a reflection of the antibody content of the blood serum; *e.g.*, Schultz (1935) showed by an examination of quarter samples from 7,721 cows that the complement-fixation test was a useful help, but that it was negative in 15 per cent. of cases where lesions were detectable, and that 80 per cent. of positive serological reactions were not correlated with the results obtained by guinea-pig inoculation.

It seems, therefore, that for the present at least, the

reliable diagnosis of udder tuberculosis must rest with microscopic, cultural or biological examinations. The outstanding advantage of the microscopical examination is the speed with which it can be carried through in comparison to the six weeks which must elapse in many cases before the results of animal inoculation can be obtained. The occurrence of intercurrent infections in guinea-pigs before diagnostic lesions of tuberculosis are produced can also occasionally cause unfortunate delay and expense. In the hands of an experienced microscopist, microscopic examination proves very reliable, and one of very great value in the eradication of clinical cases with the minimum delay.

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BAIL MILKING

"According to a survey of bail milking, the system which is associated with the name of Hosier, there are only three such herds in Scotland managed on these lines," states *The Farming News*, and continues: "The milking-bail seems to thrive best in the southern uplands of England such as Wilts, Somerset and Hants. Wiltshire, which had 34 farms following the bail system in 1932, had increased its number to 64 last year. Somerset had marched from 4 to 29, and Hants from 10 to 26. The total in British farming is given as 195 against 92 eight years earlier. Cheshire is the only county to fall out of the list. To-day 22 per cent. of bail-users have farms of over 1,000 acres. The Agricultural Economics Research Institute at Oxford, which made the survey, reports one farm of 200 acres with a two-stall bail and a herd of 24 cows worked single-handed by a woman. She is certainly a heroine. Our main Scottish patron of the bail system is Lord Cochrane of Cults. In the West, the dairy farmer holds that the land, unless it is of light texture, is too badly poached by this system."

* * * * *

At Bellingham (Northumberland) police court Miss Helen M. Walker was fined £4 and £5 costs for permitting sheep-dip to flow into a burn, and her shepherd, Robert Davidson, was fined 20s. for allowing the sheep-dip to flow into the stream. Farther down the burn about 400 dead fish were found.

The Treatment of Anoestrus in Domestic Animals with Stilboestrol Dipropionate

R. F. MONTGOMERIE
and
GEORGE BROWNLEE
Wellcome Physiological Research Laboratories, Beckenham

The timely publication by Folley and Malpress (1941) draws attention to the possibilities in the field-use of oestradiol benzoate in the treatment of anoestrus in cows and heifers. Their evidence carries further the observations of Ernst (1939) and others on the original work of Steinach *et al.* (1934) on the treatment of sterility in cattle and pigs. The application of the early observations of Steinach *et al.* (1934) in field practice has been hindered by the lack of potent material at an economic price. The availability of oestradiol in quantity provides potent material in a pure form, but the natural product is still expensive. The introduction of the synthetic oestrogen stilboestrol by Dodds *et al.* (1938) provides an inexpensive product which has all the properties of the naturally occurring hormone. It is fortunate that stilboestrol has had a wide and successful trial in human medicine before being employed in veterinary practice since its pharmacology and toxicity have been carefully studied.

Our experimental work on the use of stilboestrol in the treatment of anoestrus in animals has been spread over two years, and although the observations are still far from complete, current interest in this subject seems to justify a brief reference to our results to date. It is hoped thereby to stimulate interest in this simple method so that the more fundamental observations may be confirmed. Most of the work has been done in cows and heifers, but some of the earlier results were obtained in the ewe.

Anoestrus in cows and heifers of the small dairy breeds has been treated with 10 mgm. of stilboestrol dipropionate, but in the heavier breeds 20 mgm. has been used. It is possible that smaller doses will prove equally effective and this possibility is being examined. The reports to date show that in the non-pregnant anoestrus animal a single intramuscular injection of stilboestrol dipropionate in oil invariably results in oestrus in a few days to be followed by a regular succession of normal cycles. We have been surprised to learn that cows and particularly heifers nearly always conceive when mated at the first oestrus after treatment. We have always believed that the fertile mating of cows at a first oestrus induced by oestradiol described by Steinach *et al.* (1934) and now by Folley and Malpress (1941) was due to a "trigger" mechanism whereby the mechanics of the artificial oestrus caused the rupture of a follicle already in existence. In the absence of conception the rhythm, artificially started, was maintained. It is obvious that the observations in heifers demand another explanation which will apply to cows and heifers. *It seems probable that the natural or synthetic oestrogens in suitable doses directly stimulate the anterior pituitary, resulting in the release of follicle-stimulating and luteinising hormones.*

The obvious advantages of oestrogen treatment over ovarian manipulation, or manipulation and pregnant mare's serum, have been well stated by Folley and Malpress (1941). A table of suggested doses for

treatment of anoestrus in common domestic animals is given here.

A table of doses for the treatment of Anoestrus in domestic animals by Stilboestrol dipropionate.

Animal	Dose	Observer
Cows and Heifers—		
Channel breeds ...	10 mgm.	Gould
Cows and Heifers—		
heavier breeds ...	20 mgm.	Hignett
Ewe	1 mgm.	Brownlee
Sow	5 mgm.	Authors' suggestion
Bitch	2 mgm.	Authors' suggestion

The observations on cows and heifers of Channel breeds were chiefly made by G. N. Gould, M.R.C.V.S., of Southampton, and those on the heavier animals are from Mr. S. L. Hignett, B.Sc., M.R.C.V.S., Veterinary Investigation Officer, The University, Leeds, and are taken from experimental work in progress. We are indebted to these two workers for kind permission to quote their results in advance of their detailed publications.

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CLINICAL COMMUNICATION

Intussusception in a Cow

H. F. HEBELER, M.R.C.V.S.
Langport, Somerset

Subject.—Shorthorn cow about ten years old. She had last calved in March this year.

History.—The cow had been out at grass for three months. On the Monday she had been quite well and had passed faeces while being milked out of doors. On the Tuesday evening she did not seem very well and her milk yield had dropped considerably; she was brought in and given a "red drink." Advice was sought next morning.

Symptoms.—No faeces had been passed overnight and none had been seen definitely since the Monday night.

The cow was dull and shivering, food was refused but she drank some water. Temperature was 97·2, pulse slow and weak and respiration slow and shallow. The nose was dry and horns and ears were cold.

Auscultation revealed no abnormality in the lungs and practically no bowel movements. A "grunt" could not be produced by various means of abdominal palpation. Rectal examination found the rumen fairly full but soft; a firm mass could be palpated next the rumen near the entrance to the pelvis, this felt like a piece of impacted bowel. On producing a flow of urine it was found to be strongly coloured but there was no sign of haemoglobinuria.

Diagnosis.—Impaction, probably of the intestine and not the stomachs owing to the absence of a grunt and the findings during rectal examination.

Treatment.—The stomach tube was passed and sodium chloride ʒxvi, mag. sulph. ʒx, and liquor ammon. aromat. ʒii were given in one and a half gallons of warm water. She was then warmly clothed and water was supplied but all food withheld. Two doses of liq. ammon. aromat. were left to be given that night and next morning. The next day she had passed three small knobs of faeces which were very dark, hard and coated. The temperature had risen to 106° and she looked very much brighter though still refusing food. At this stage a definitely hopeful prognosis was made. A powder containing ½ oz. doses each of nux vomica and ammon. carb. was left to be given night and morning. On Friday morning she appeared to be much the same. No faeces had been passed. The temperature was 101°. There were signs of abdominal pain such as kicking at the belly and stretching. She spent much time lying down. Rectal examination found no faeces and the firm mass to the left of the pelvis could no longer be felt. About six gallons of warm soapy water was pumped in slowly as an enema. This had no effect by the evening and practically all of it was retained. That evening ʒv of "Istin" was given as a drench. Next day the abdominal pain was more marked, temperature 101·5°, rectal examination again negative except that considerable quantities of stiff dark mucus similar to black-currant jam was withdrawn by hand and expelled by the cow. A further enema was given. It was decided to send the cow for slaughter as a casualty on the Monday (48 hours later) if no faeces had been passed by then, and for this reason no further medicines were given. However, she died at 7 p.m. the next evening (Sunday).

Post-mortem Examination.—This was carried out at 9 a.m. on Monday morning. It revealed no abnormality except:—

(1) A slight degree of peritonitis and increased fluidity of stomach contents.

(2) Intestines comparatively empty of food.

(3) About 4 feet from the colon the ileum had invaginated to a length of about 9 inches. There was in fact a double invagination, a cross-section of this part showing ten layers of mucous membrane. The invaginated portion was black and necrotic on section of the mass, but externally the degree of inflammation was not so marked as might have been expected.

Discussion.—This case is noted because it shows the train of symptoms found in this comparatively rare condition of adult cows. The rise in temperature of 9° in 24 hours is interesting but difficult to explain.

HILL SHEEP SUBSIDY

The Minister of Agriculture announces that the Hill Sheep Subsidy Scheme will be continued for a further year, after consultation with the Secretary of State for Scotland regarding any necessary modifications in the conditions of the scheme and the rate of subsidy.

* * * * *

Weekly Wisdom

The good yeoman improveth his land to a double value by his good husbandry. Some grounds that wept with water, or frowned with thorns, by draining the one, and clearing the other, he makes both to laugh and sing with corn. . . . His industry worketh miracles, by turning stones into bread.—Thomas Fuller.

* * * * *

Erratum.—It is much regretted that the qualification, F.R.C.V.S., of Mr. J. S. Steward, the author of the first article in our issue of September 6th, was erroneously reproduced as F.R.C.S.

ANNOTATION

Trichiniasis

The recent publication of further results of the investigation of outbreaks of trichiniasis in English people early this year makes necessary additions to our earlier annotation on this subject[11]. A team of workers under the direction of Professor R. T. Leiper, financed by the Agricultural Research Council, and working at the Institute of Agricultural Parasitology, St. Albans, Herts, have had the assistance of Dr. Paul Beeson, physician to the American Red Cross Harvard Field Hospital Unit, and some of their joint results have been published in the *Proceedings of the Royal Society of Medicine*[2]. Beeson there points out that the usual source of human trichiniasis is pig meat eaten raw or insufficiently cooked and that pigs usually infest themselves by eating infested rats or infested raw pig meat contained in garbage. In the United States garbage-feeding of pigs is common; where it is practised the highest incidence of trichiniasis in pigs is also found, the lowest incidence occurring where pigs are grain-fed. Miss Young[2] quotes the statement of Hall and Schwarz that they found in the United States 4 to 5 per cent. incidence in pigs fed on uncooked garbage and 1 per cent. in grain-fed pigs. Beeson thinks it wrong to conclude that garbage-feeding attracts rats, which infest themselves and are eaten by pigs so that the incidence in pigs rises, because, if garbage is boiled before it is fed to pigs, the incidence of trichiniasis in pigs is reduced, although presumably the rats still have access to the garbage before and after it is boiled. He quotes the opinion of Hall[7] that, in the United States, rats are a relatively unimportant source of infestation of pigs. In Britain, on the other hand, the law requires the boiling of garbage before it is fed to pigs and trichiniasis is so rare in this country in both man and pigs that the few cases that occur can hardly be attributed to garbage-feeding.

Miss Young[2] pointed out that there are only two published records of the examination of pigs for trichiniasis in this country, one by Cobbold[4] in 1879, who confirmed the finding of one infested pig by Dickinson[6] in 1871 and the other by Hardy[8] and Paul [12A], who could not find a single positive in 1,000 Worcestershire pigs. Miss Young had examined, at the date when she gave her results, 4,086 pigs without finding a single positive. These pigs came from the Wolverhampton area, where one of the outbreaks in man occurred early this year and where human trichiniasis appears to have been endemic for many years (see below). Miss Young examined a piece of the pillar of the diaphragm of each pig. The first 2,731 were examined both by direct microscopical examination and by digestion of the muscle in artificial gastric juice. It was then found that the latter method was the best, so that this only was used for the examination of the remaining 1,355 pigs. As pork pigs live only a few months to a year before being slaughtered, they have relatively little time to acquire infestation, so that Miss Young is now examining only sows and boars, which may be ten years old at the time of slaughtering.

The following are published techniques of the digestion method: Catron[3] digested each 50 g. of human diaphragm in 0·5 per cent. HCl and 0·7 per cent. pepsin (11·5 c.c. conc. HCl, 7 g. pepsin and 1,000 c.c. water), constantly stirring the mixture for five to eight hours at 37 to 43° C. By then no visible lumps were left. The fluid was left to stand overnight; all but about 200 c.c. was siphoned off and this was diluted to 1 litre with water and poured into a Baermann filter, the larvae being drawn off after about four hours. McCoy, Miller and Friedlander[12] adopted a similar method. Lyster[10] used 0·1 g. commercial papain in 313 c.c. of normal saline to digest each 100 g. of muscle, digestion being complete in 38 hours.

If we may conclude from these results—and it seems that we can—that garbage is not the source of the apparently very rare infestation of pigs in Great Britain, the rat seems to be the most likely source of British trichiniasis. Beeson regards trichiniasis as endemic in rats in Britain, noting that Harris[9] noted it in rats in Devon. He thinks that rats transmit it to one another by cannibalism and by eating other animals and acquire it by scavenging. Leiper, R. T., discussing Beeson's paper, stated that trichiniasis was found in 25 per cent. of rats recently caught in South London, in 9 out of 116 caught in the Penrith town refuse dump and 2 out of 13 caught at the Wolverhampton sewage works (in both these towns outbreaks of human trichiniasis occurred early this year); but, at the time when Leiper spoke, no infested rats had been caught on the farms around Wolverhampton and Penrith and the source of the pigs actually causing the human outbreaks early in 1941 had not by then been traced. A smallholding some way from Penrith was suspected as being one source and this was not far from the town refuse dump on which infested rats had been caught. The pigs still on this smallholding were not infested and rats could not be obtained from it, but one out of three cats living on this smallholding was infested with trichinella.

Beeson[1] discusses the clinical features and diagnosis of trichiniasis in man, emphasising the great variability of the symptoms. The textbook classification of the symptoms into intestinal ones, produced when the adult trichinellae are in the wall of the host's intestine, those produced when the larvae are being disseminated all over the body in the host's blood, and those produced when the larvae are in the muscles, is seldom observed in practice; it is probably typical of the severest cases only. Relatively few cases are ever recognised clinically, most people having few distinctive symptoms (*e.g.*, malaise, backache, fatigue), or none at all. Beeson describes the symptoms of the severer cases—they cannot be summarised without causing serious misunderstanding—but differential diagnosis may have to be made between trichiniasis and dysentery, influenza, typhoid fever, bronchitis, pleurisy, pneumonia, meningitis, encephalitis; the oedema of the eye region and face which is so characteristic of trichiniasis may be erroneously ascribed to sinusitis or nephritis. The proportion of cases showing intestinal symptoms is small; symptoms and the severity of the illness vary greatly according to the situations in which the larvae settle, the number of larvae present and the resistance of the host. English people are probably less resistant than people of some other countries (*e.g.*, Germany, the United States), because trichiniasis has been so rare in this country (see below). Van Someren[16], for example, quoted by Beeson[2] and Jolly[2], reviewed all the cases reported

in the British Isles earlier than 1937 and gives only 26 cases, although others may have been recognised but not reported. Jolly[2], Medical Officer of Health for Wolverhampton, concluded that the disease is probably endemic in man in the Wolverhampton area and possibly also in parts of Cumberland (Penrith and Workington) and in the Milford Haven area. This view is supported by Miss Young's[2] microscopical examination this year of human diaphragms from the Wolverhampton area. Out of 30 diaphragms so far examined from the Royal Hospital, Wolverhampton, five were infested, *i.e.*, about 17 per cent., a figure which is approximately the same as that found in the United States (see below). It is possible that examination by the skin test (see below) might reveal a higher incidence. Out of five diaphragms from Birmingham, one was infested; but no trichinellae were found in five diaphragms from Bristol, two from Cambridge, three from Cardiff and two from Llandough. Of the Wolverhampton diaphragms, all the positives occurred in the first 15 examined and 30 per cent. of the positives were from women and 10 per cent. from men, a figure which may be compared with Sheldon's[15] finding of an incidence in the clinical cases diagnosed of four women to one man (see previous annotation[11]). Jolly[2] stated that 60 per cent. of the cases occurring in the recent (1941) outbreak in Wolverhampton were traced to three manufacturers, who supplied 60 per cent. of all the sausages consumed in Wolverhampton and district (*i.e.*, 16,000 lb. out of a total of 26,900 lb. a week). The pigs from which these were made came mostly from Staffordshire and Shropshire, but no infested pigs had been found on the farms supplying the pigs. He suggested that one pig may have infested 37, and another may have infested 12, of the 75 cases traced to meat supplied by certain manufacturers. As Beeson[2] pointed out, the war-time manufacture of sausage from old sows, which have lived longer and therefore are more likely to be infested, may have contributed to the recent outbreaks; and war-time reduction of meat in sausages may distribute the meat from one pig over a wider population than is usual in normal times, so that a few infested pigs might have caused all the cases diagnosed during the recent outbreaks. Perhaps it would also be true to say that war-time rationing of other meats causes more people than usual to eat sausages and more of them.

Trichiniasis Control in the U.S.A.

This information about the incidence of trichiniasis in this country may be contrasted with studies of its incidence in the United States. Beeson[1] states that trichiniasis is rarely diagnosed there, but that several millions of people must be infested and many thousands of cases occur annually. He quotes the results of autopsies reported by Sawitz[13], who found that in some localities over 20 per cent. of the population had been infested. Catron[3] found trichinellae in 44 out of 300 human diaphragms at the University Hospital, Ann Arbor, Michigan, *i.e.*, 14·7 per cent., and none of these positives had given any history of infestation.

This relatively high incidence of the disease in man in the United States adds interest to the recent article by Schwartz[14], of the Bureau of Animal Industry of the United States Department of Agriculture, on meat inspection in that country in relation to trichiniasis. Schwartz says that hogs heavily infested with trichinella are exceptional in the United States and that most hogs slaughtered in that country are well under one year old, so that they have had less time than older pigs to acquire an infestation. He states that there used to be a Federal meat inspection of pigs by microscopical examination, similar to the German system, but that the recognised methods of doing this were proved to be inefficient. German meat inspectors found trichinellae in pork certified by United States inspectors to be free from them, because the latter examined only three samples of meat from each pig, each the size of an oat grain and, as the trichinellae are not uniformly distributed in the muscles, some infested carcases are not detected by this method. On the other hand, the United States Bureau of Animal Industry supervised an inquiry in Germany which showed that about 33 per cent. of 6,000 cases of human trichiniasis in Germany were due to pork certified by *German* inspectors to be free from trichinellae. In addition to this, Federal meat inspection did not apply to all hogs killed in the United States, but only to plants engaging in inter-State and/or foreign commerce. It thus included pork exported to countries which required a certificate that the meat had been inspected before these countries would import. Schwartz points out that it was, therefore, an inspection done for economic and not for hygienic reasons. Plants subject only to State or Municipal inspection, and animals killed on the farm, could escape all inspection. Further, the cost of microscopical inspection was prohibitive. Federal meat inspection dealt with about 40 million hogs a year at a cost of about 25 cents per hog, the total cost per year amounting to $10,000,000, which was almost twice the total cost of the present-day total cost of all Federal meat inspection. Finally, Schwartz thinks that the knowledge that meat inspection is practised encourages the consumption of raw pork by human beings. Schwartz does not mention the use of the skin test for the diagnosis of trichiniasis in pigs (see our earlier annotation[11]). He concludes that Federal meat inspection, by transferring its attention to the supervision of cooked meats containing pig tissues, can ensure that the products which it is able to control are safe for human consumption. Out of 10,000 samples from such products (the list which he gives includes various forms of sausage and bacon and ham) examined during the last few years without notice, no trichinellae have been found capable of developing in animals proved susceptible. The tests applied to them seem to be rigorous enough. They are fed to white rats, which are examined for trichinellae after 30 days, or earlier if they die. If none are found, the whole musculature of the rats is digested and examined. If even the slightest evidence of an infestation is found, the food products concerned are condemned.

The treatment required by Federal meat inspection for cooked meats containing pig tissues includes heating until all parts of the product reach 137° F., refrigeration to a temperature not higher than 5° F. for a continuous period of 20 days or to lower temperatures for specified periods, and certain special curing methods, especially salting at specified temperatures. Tests have shown that all the methods prescribed will kill trichinellae. Beeson[2] states that 60° C. will kill the larvae, but Hardy[8] quotes Woodhead's[17] opinion

that ordinary boiling and roasting rarely produce 60° C. at the centre of joints over 6 lb. in weight. Sir John Robertson personally communicated to Hardy similar unpublished results of experiments on boiling. The two cases of human trichiniasis at Smethwick in 1927, reported by Hardy[8], occurred after a dinner cut from a 9 lb. leg of pork roasted for four hours in a coal-fire oven. Beeson[2] thinks that frying thin slices of bacon and ham should kill all the parasites and says that, if the juice from the meat has become brown or grey, 80° C. has been reached, so that all the parasites will have been killed. He further states that the larvae will live many weeks in meat kept at 0° C., but that 15° C. for 20 days will kill them. We understand that the effect on trichinellae of ordinary domestic methods of cooking pig meat is now being investigated in this country.

Diagnostic Technique

The diagnosis of trichiniasis in man is not easy. For the detection of mild and symptomless cases, Beeson[1] relies especially upon the eosinophilia and the intradermal test, the latter being the more specific. He thinks that the differential leucocyte count is the best guide to *early* diagnosis. A relative and absolute increase of the eosinophils is an almost constant accompaniment of the stage when the larvae are being disseminated from the intestine. A total leucocyte count of more than 10,000 per c.mm. and an eosinophil count of more than 400 constitutes an eosinophilia and it may persist for three months after the infestation begins. There are, however, variations from day to day and his article should be consulted. Della Vida and Dyke[5] studied the blood picture in about 100 cases in Wolverhampton early this year and summarised the earlier literature about it. They found a primary leucocytosis appearing immediately after the symptoms began and lasting three to four weeks, followed by a second leucocytosis which reached its peak at about the eleventh week after the symptoms began (cf. the similar leucocytosis in the pig, see below). The number of eosinophils closely followed the rise and fall of the leucocytes, but it was reduced, or the eosinophils disappeared, in the first three days after the symptoms began. Monocytes increased with this early decrease of the eosinophils and in these early stages some neutrophils contained eosinophilic granules. Neutrophils decreased with the leucocytosis and increased as the eosinophils decreased.

Beeson[2] thinks that the intradermal test with a saline suspension of powdered larvae as antigen (see our earlier annotation[11]), is relatively specific; but positives may be obtained for several years after an infestation. Routine tests done with it on American hospital patients have obtained positives in 10 per cent. of the cases examined. A positive does not, therefore, necessarily indicate a recent infestation. Beeson and Colonel Maddock, of the Ministry of Health[2], have recently obtained, in parts of England where outbreaks of trichiniasis have occurred, a positive reaction in every one of 22 persons who had had trichiniasis during the three to four months preceding the tests and in 12 out of 80 others known to have had the disease, nine of whom had been ill during recent outbreaks, the other three being presumed to have had either trichiniasis without symptoms, or a previous infestation. The antigen used for these tests was supplied by the Division of Zoology, National Institute of Health, Washington. The method, described by Beeson[1] is to inject into the skin of the forearm 0·1 c.cm. of a 1 in 10,000 dilution of the antigen and an equal amount of normal saline 5 cm. distally from this as a control. (The importance of the degree of dilution and of the saline suspension is noted in our earlier annotation[11].) Delayed or immediate positives may occur. The delayed type appears after 12 to 24 hours as a redness and induration similar to a positive tuberculin reaction; it may occur as early as the end of the second week of the illness, but it is usually present for only a few days, after which the response is immediate. The immediate reaction occurs during the third or fourth week of the illness and can be obtained for many months or even years. It is usually a wheal and erythema, or erythema only, appearing within ten minutes after the injection and beginning to fade after 15 to 20 minutes.

If the skin test is indecisive, the precipitin test, consisting of adding undiluted blood serum to an equal volume of antigen diluted 1 in 200 or 1 in 500 and incubating for one hour at 37° C., may be tried. A precipitate indicates the presence of specific antibody. Precipitins may appear at about the time when the skin test becomes positive. (See also the cautions noted in our earlier annotation[11].)

Attempts to demonstrate the parasite in the human host may also be made. Adult worms are excreted in the faeces, but are not easily found, but larvae can be found in the blood during the first three to four weeks, by diluting 5 c.cm. of blood with ten volumes of water, centrifuging and examining the sediment for larvae about 100 × 6 microns in size. Examination of 1 g. of deltoid or gastrocnemius muscle removed under a local anaesthetic, either by pressing it between two pieces of strong glass or by cutting sections of it, may reveal larvae. (Alternatively the bits of muscle could be digested by the method noted above.)

In the pig the clinical signs of trichiniasis have been investigated recently by Leiper, J. W. G.[2]. He found that massive doses of larvae produced no more than symptoms which the average farmer would ascribe to a slight chill. A week after the doses the pigs were listless and more easily handled; they had lost appetite and did not thrive well. An eosinophilia, rising to 30 to 31 per cent. on the 19th day after the dose, with a return to normal by the 26th to 29th day, was followed by a second slighter increase of eosinophils to 10·5 per cent. (cf. the similar findings in man noted above). There seems to be no reason why the skin test should not be as valuable for the diagnosis of trichiniasis in pigs as it is in man, provided that the right (saline) antigen is available in sufficient quantities and that it is used by workers familar with its use.

References

[1]Beeson, P. B. (1941.) *The Lancet.* (ii). 67-69. Trichiniasis. Clinical Manifestations and Diagnosis.

[2]*Idem.* (1941.) *Proc. Roy. Soc. Med.* **34.** 585-594. Factors influencing the prevalence of Trichinosis in man, together with discussion by Leiper, R. T., Leiper, J. W. G., Young, M., Rogers, W. P., Clapham, P. A., and Jolly, R. H. H.

[3]Catron, L. (1940.) *Amer. J. Hyg.* **32.** 12-32. Incidence of Trichinosis in 300 autopsies at the University Hospital, Ann Arbor, Michigan.

(*Concluded at foot of col.* 1, *page* 572.)

ABSTRACTS

[I.—A PRELIMINARY REPORT ON THE EFFECT OF COLLOIDAL SILVER OXIDE ON BOVINE MASTITIS. Weirether, F. J., Anderson, E. O., Johnson, R. E., Plastridge, W. N., and Jungherr, E. (1941.) *Amer. J. Vet. Res.* **2.** 141-145;

II.—EFFECT OF NOVOXIL LIQUID ON CATARRHAL (CHRONIC) MASTITIS AND ON *STREPTOCOCCUS AGALACTIAE* UDDER INFECTION. Klein, L. A., Kleckner, A. L., and Biltz, R. D. (1941.) *Ibid.* **2.** 145-151.]

I.—The silver oxide used by the authors was in the form of a non-aqueous dispersion of silver oxide in mineral oil. In each of three cows, infected in all four quarters with *Str. agalactiae*, one quarter was treated daily for a number of days with concentrations of silver oxide varying from 1 to 10 per cent. Treatment was carried out after milking; the silver oxide was injected directly into the milk cistern *via* the teat canal followed by gentle massage of the quarter. Bacteriological examination showed that the milk from the treated quarters was rendered free from *Str. agalactiae* for periods of from 11 to 37 days. Since no special precautions were taken to prevent reinfection, the reappearance of *Str. agalactiae* may have been caused by reinfection from without, or from organisms located in remote lesions within the gland which had escaped the bactericidal action of the silver oxide. In a cow in which one quarter was affected with coliform mastitis the milk was permanently freed from organisms after two daily injections for six days. The injection caused only mild irritation of the udder when given once a day but a marked irritation when given twice daily.

II.—Good results are stated by the authors to have been obtained in the treatment of chronic mastitis by injections of novoxil liquid (a colloidal dispersion of silver oxide in a light mineral oil). Thus, of 67 quarters treated 59, or 88·1 per cent., were freed of *Str. agalactiae* infection; approximately half of the quarters showing clinical symptoms were cured. A 5 per cent. concentration of silver oxide was used in the majority of cases; injections made at 24-hour intervals appeared to be more effective than at 72-hour intervals. Three to five injections were more effective than a lesser number. Swelling of the udder and altered secretions occurred in all cases following the injections. The milk had almost returned to normal in about five days after the last injection.

N. J. S.

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[THE HAEMOGRAM IN THE DIFFERENTIAL DIAGNOSIS OF METRITIS AND PYOMETRA. Khuen, E. C., Park, S. E., and Adler, A. E. (1940.) *N. Amer. Vet.* **21.** 666-670.]

The difficulty in making a differential diagnosis between metritis and pyometra in dogs as the result of a clinical examination alone is stressed. The authors have found that the blood picture of the patient is of value in making a diagnosis, and they give data on twelve cases of metritis and 16 cases of pyometra, also the data of two cases of false pregnancy. In pyometra the leucocyte counts and the number of immature forms are higher than are found in metritis, although the lymphocyte count is lower. The higher the total leucocyte count, the more remote is the probability of recovery, especially if the immature forms are low or absent. The lower the total leucocyte count (but above 10,000), coupled with a high percentage of immature forms (ranging between 10 and 40 per cent.), the greater the chance of recovery. The higher the lymphocyte count (not to exceed 40 per cent.), the more favourable is the prognosis. Erythrocyte counts are found useful in determining whether transfusions in pre- and post-operative treatment are necessary.

D. W. M.

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[CANINE INFLUENZA. Whitney, L. F. (1941.) *Vet. Med.* **36.** 216-219.]

"Canine Influenza" is the author's term for a condition which he considers to be distinct from canine distemper. Observations have been made since 1935 on over 150 cases.

The disease has been noted during the winter months at the same time as epidemics of human influenza and as a result the author suspects a possible association between the two conditions. It is contagious and the incubation period appears to be about six days. Young dogs are more frequently affected than adults. It does not affect animals which have recovered from or which have been vaccinated against distemper, but on the other hand animals which have recovered from "Canine Influenza" are still susceptible to distemper. This statement is supported by clinical observation and direct experimental evidence on two dogs.

The affected animals have suddenly become ill with anorexia, photophobia, running fits, pain on touching the head, a discharge from the eyes and nose and a high temperature. Recovery has generally occurred in about a week but some fatalities have resulted from a secondary pneumonia.

J. W. H. H.

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G. Lapage.

NOTES AND NEWS

The Editor will be glad to receive items of professional interest for inclusion in these columns.

Diary of Events

Oct. 2nd.—Annual General Meeting of the Central Veterinary Society at the Conway Hall, W.C.1, 2.15 p.m.
Oct. 3rd.—Meeting of the North of England Division, N.V.M.A., at Newcastle-on-Tyne, 4 p.m.
Oct. 6th.—R.C.V.S. Committee Meetings, Royal Station Hotel, York.
Oct. 7th.—R.C.V.S. Committee Meetings, Royal Station Hotel, York.
Oct. 8th.—R.C.V.S. Council Meetings, Royal Station Hotel, York.

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PERSONAL

The heartfelt sympathy of their many friends in the profession will be extended to Mr. W. W. Lang, M.R.C.V.S., and Mrs. Lang, of Brigg, Lincs, who have been officially notified that their only son, Lance-Corporal John Lang, 11th Scottish Command, has been killed in action. Mr. John Lang was twenty years of age.

Appointments.—Mr. D. L. Robarts, D.SC., M.R.C.V.S., and Miss Jean Gardner, B.SC. (HONS.), have been appointed temporary Research Officers of the staff at the Veterinary Laboratory of the Ministry of Agriculture and Fisheries, New Haw, Weybridge, Surrey. The former began duty on July 24th and the latter on September 15th.

Births.—STEWART.—At Matlock, on September 12th, 1941, to Elsie, wife of J. H. Stewart, M.R.C.V.S., of Wirksworth, Derbyshire, a son.

SUTTON.—On September 17th, at Summer Court Nursing Home, Southborough, Kent, to Heather (*née* Streeter) and Peter Sutton—both Members of the Royal College of Veterinary Surgeons—a son.

Marriage.—HEWER—JAMISON.—On September 16th, 1941, at Star of the Sea Church, Sandymount, Dublin, John D. R. Hewer, M.R.C.V.S., The Grange, Swindon, to Patricia Jamison, Ballsbridge, Dublin.

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R.C.V.S. OBITUARY

BAIRD, Archibald William, 40, York Place, Edinburgh. Graduated December 17th, 1921. Died August 23rd, 1941; aged 46 years.

CORRESPONDENCE

Letters to the Editor should reach the Office not later than by the first post on Monday morning for insertion in following Saturday's issue.

The views expressed in letters addressed to the Editor represent the personal view of the writer only and must not be taken as expressing the opinion or having received the approval of the N.V.M.A.

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THE SCHEME OF THE SURVEY COMMITTEE OF THE N.V.M.A.

TO THE EDITOR OF THE VETERINARY RECORD

Sir,—I wish to associate myself with Mr. Beckett in appealing to veterinary practitioners to consider now their views on this scheme and to be prepared to express these views very firmly when this matter is brought before their Divisions of the N.V.M.A. I would recommend to their notice and earnest consideration the summary of Divisional criticisms which appeared in the supplement to *The Veterinary Record*, August 30th, and also Mr. Beckett's letter in *The Veterinary Record*, September 6th.

For my own part I would like to submit to my fellow practitioners a few questions:—

(1) Is it not probable that if this scheme is adopted, no matter how accurately it may be presented by the profession to the public, it will be seized upon by the agricultural and, what is much worse, by the lay Press as the beginning of a golden age in which no disease of cattle can hope to escape extinction for more than a few months? Do you feel that we as a profession are in a position to live up to such expectations?

(2) Are you personally satisfied that the treatments recommended are sufficiently satisfactory in actual practice to form the basis of an undertaking to control contagious abortion, sterility, mastitis and Johne's disease, or even any two of these concurrently on the same farm?

(3) Are you confident that, aided by every means at your disposal, you can persuade all your clients—for every one of your clients who owns even a single cow is a prospective client under the scheme—and through them their stock attendants, to exercise sufficient care and vigilance to obtain the best results from your efforts?

(4) Have you many clients who will voluntarily subscribe to this scheme when all is well with their herds? Is it not very probable that the treatment of a herd suffering from, say, a very severe outbreak of mastitis and/or sterility will prove a loss both in time and in money to the practitioner?

(5) If, as appears within the bounds of possibility, this scheme is but an introduction to a complete bureaucratic control, do you feel that such a development would be in the best interests of agriculture and of the profession? Do you relish the prospect of submitting, day by day, details of your clinical findings, diagnosis, prognosis and opinion to an omniscient Whitehall to have the three last completely ignored and the first "interpreted" by some magic rule of thumb and finally to receive from Headquarters instructions as to the method of treatment you must adopt?

(6) Is it your opinion that the control of tuberculosis is now so well in hand that we are free to take on fresh conquests? Or is this scheme a screen to hide the profession's inability to deal with this task efficiently?

That the profession should make a concerted attack on one of the major diseases of cattle is both wise and timely, provided that we can avoid the dead hand of bureaucracy. To attempt the control of the five major diseases at one and the same time is to invite and court, nay it is deliberately to wed, disaster.

Yours faithfully,
J. P. PICKERING.

Long Close,
Hexham,
Northumberland.

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THE CONTROL AND TREATMENT OF INFERTILITY

TO THE EDITOR OF THE VETERINARY RECORD

Sir,—The value of spinal anaesthesia in the bovine is beyond dispute, but after nearly 20 years' experience in the treatment of bovine infertility, all the restraint and assistance that I consider or have found necessary, is to have one man at the head, holding the nose, and another at the tail, keeping this out of my way, and assisting me later, as by holding the irrigation container.

It should be remembered that in carrying out the treatment of pronounced cases of pyometra, the procedure is tedious, and if a spinal anaesthetic has been used, the animal may go down before it is over.

Whilst admitting that not a few experts advocate the so-called Munich technique—of retracting the cervix with one hand which has been inserted in the rectum, whilst the other guides the catheter in from below—and agreeing that it is useful when the whole arm cannot be inserted into a small vagina without causing irreparable damage to its walls, I do not like it: and I think that if use is made of Albrechtsen's speculum, even in the smallest of

heifers little difficulty should be experienced in seeing and retracting the cervix. The Munich technique is expeditious, and if adopted, the catheter should have a bayonet-fitting mount, which fits on to a syringe of 200 to 250 c.c. capacity.

Mr. Gould has introduced a very useful and practical innovation by having a sliding stop fitted to his Nielsen catheter, as on the mandrin of Albrechtsen: and in the case of heifers, especially, this should to no small degree minimise the risk of perforation. As he quite rightly pointed out at the Southern Counties meeting at Salisbury, perforation, *per se*, is not attended by any untoward result. It is the subsequent injection of iodine through it which causes the trouble. It will often be found that it is the last annular ring in the cervical canal which impedes the free passage of the catheter and if anyone is dubious after passing it, withdraw the catheter, and then reinsert it. If it goes in easily, irrigation can be proceeded with, for it is very unlikely that the same perforation will be penetrated twice, unless the rent is very large.

In cases of vaginitis, I regard local treatment as futile. The uterus, and in particular the cervix, should be irrigated, and the vaginal walls liberally splashed with the same solution, whilst the arms acts as a "plug." I adopt the same procedure in all cases requiring uterine irrigation.

The Bayer Film, with which most members are now familiar, is excellent, but it is not immune from criticism —I intend, however, to comment only on one point. In cases of pyometra, the use of wheat germ oil (vitamin E) is demonstrated and advised. Wheat germ oil has only one possible use, and that is, the preservation of pregnancy, in the absence of any clinical evidence of disease in the uterus or its adnexa. Prolan is also advised. I prefer a large dose of pituitrin to stimulate activity of the uterine walls, which have become "paralysed" through the presence of the pyometra.

I am glad to notice that large doses of oestrogenic compounds are being advised. When carrying out field trials with Prolan, I was soon convinced that nothing less than 500 R.U. in the case of the mare and cow could be expected to achieve results. Whenever cases of anoestrus are encountered, the ovaries should be examined, for if a corpus luteum persistens is present, its enucleation is all that is indicated. On the other hand, if this body is firmly embedded in the substance of the ovary, conveying the impression of a stone inside a cherry, no attempt should be made to express it, for irreparable damage to the ovary will follow. Resort to oestrogenic compounds.

The risk of haemorrhage resulting from enucleation is, in my opinion, rather exaggerated, and if the cavity is compressed, or the ovary pressed against the pelvis for a few seconds, no fear need be entertained.

Yours faithfully,
J. F. D. Tutt.

"Rothiemurchus,"
St. Cross,
Winchester.

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HEAT STROKE IN A MARE

To the Editor of the Veterinary Record

Sir,—I should be interested to hear from those who have had experience in hot climates if the diagnosis of heat stroke made in the following case is likely to have been correct.

The subject was a cross-bred hackney mare of light vanner type, 8 years old, with third foal, 2 months old, at foot. The mare was stated to have been always unusually susceptible to heat and flies.

The case occurred during the very hot weather early in July. The owner thought the mare was "griped," as she was blowing badly and remained recumbent; he "gave her a drink" and she appeared to recover towards evening.

Two days later symptoms recurred and I was sent for. The temperature was 102½° F. and the pulse weak. The mare did not, however, seem in pain, although breathing heavily. Fortunately I knew the owner well enough to tell him I did not know what was the matter and could only treat symptoms. Hypophysin (Bayer) 2½ c.c. were given subcutaneously and the mare left.

The following afternoon, the weather being hotter than ever, the mare appeared much worse; she was down and unable to rise, blowing badly, temperature 104° F. and pulse almost non-existent. A tentative diagnosis of heat stroke was made, and Hypophysin 3½ c.c. given. In 20 minutes the mare was up and feeding. She died, however, the same night. There were no macroscopic *post-mortem* lesions.

Yours faithfully,
P. Crosfield.

Chipping Norton,
Oxon.

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THE RELATIONSHIP BETWEEN CANINE HYSTERIA AND DOG BISCUIT

To the Editor of the Veterinary Record

Sir,—As one who is always interested in the question of hysteria in dogs, I should like to thank Mr. Hancock for his observations on the disease. Whilst to many who read the article it might seem feasible that the disease could be biscuit-borne, my personal opinion is that we should be rather sceptical and search farther for the root cause. Like Mr. Hancock, I agree that the causative agent has yet to be isolated—if indeed it can be—but I differ from him in the interpretation of his results. My belief is that all dogs have a definitely delicate mental balance, and I believe, further, that this balance is only maintained by the presence in the system of a factor which may possibly be a vitamin. The mere absence of this factor, in my opinion, does not lead the animal to go off with hysteria and in the absence of any exciting factor the dog will remain to all intents and purposes a normal dog. Let such a case be subjected to any physical or mental strain, however, and it will immediately show the usual signs of hysteria: it may be the sight of another dog having an attack; it may be the onset of an acute febrile disease, *e.g.*, distemper; it may be the reaction to inoculation against distemper; or it may be acute indigestion due to feeding on badly baked bread or indigestible biscuit.

That, Sir, is how I interpret the results got by Mr. Hancock, and it is with that theory in my mind that I have continued to give all the available vitamins to hundreds of greyhounds. I believe that it is the adoption of this course that has allowed me to have a very satisfactory record over a period of ten years.

Yours faithfully,
J. K. Bateman.

The Hook,
Northaw,
Herts.
September 23rd, 1941.

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APPARATUS FOR UDDER INFUSION

To the Editor of the Veterinary Record

Sir,—I must apologise for the inconvenience caused to readers of the *Record* who have endeavoured to obtain one of the Norden Simplex Gravity Outfits. I understand that Messrs. Willows & Co. no longer have a supply of this apparatus and are unable to obtain an import licence for them.

Also, I had failed to notice that the address of the manufacturers was Lincoln, U.S.A., and not Lincoln, England!

Yours faithfully,
H. W. Steele-Bodger.

28, Lichfield Street,
Tamworth,
Staffs.
September 22nd, 1941.